Transition nucleon resonance electrocouplings from the CLAS data on $\pi^+\pi^- p$ electroproduction off protons.

V. I. Mokeev, V. D. Burkert for the CLAS Collaboration.

We extended a phenomenological meson-baryon model JM [1] for the evaluation of $\gamma_v NN^*$ resonance transition helicity amplitudes (electrocouplings) from $\pi^+\pi^-$p electroproduction cross section data in order to provide larger kinematic coverage for resonance masses up to 1.8 GeV and photon virtualities Q^2 up to 1.5 GeV^2. A successful description of the CLAS data [2, 3] on nine differential $\pi^+\pi^- p$ cross sections was achieved, allowing us to determine the resonant contributions to cross sections. Electrocouplings of several prominent proton resonances were determined from the fit of the resonant parts of cross sections within the framework of unitarized Breit-Wigner ansatz, proposed in [4]. Consistent results on electrocouplings of $P_{11}(1440)$ and $D_{13}(1520)$ excited states obtained from analyses of π^+n and π^0p exclusive channels [5] and from our analysis of $\pi^+\pi^-$p channel with entirely different background strongly indicate reliable evaluation of resonance parameters. For the first time, results for the $S_{31}(1620)$, $S_{11}(1650)$, $F_{15}(1685)$, $D_{33}(1700)$, and $P_{13}(1720)$ states were obtained from the analysis of the $\pi^+\pi^-$p exclusive channel. The study of $\pi^+\pi^-$p electroproduction is essential for the exploration of high lying N^* states that decay preferably with emission of two pions.

References

[1] V. I. Mokeev, V. D. Burkert et al., Phys. Rev. **C80**, 045212 (2009).

[2] M. Ripani et al., CLAS Collaboration, Phys. Rev. Lett. **91**, 022002 (2003).

[3] G. V. Fedotov et al., CLAS Collaboration, Phys. Rev. **C79**, 015204 (2009).

[4] I. J. R. Aitchison, Nucl. Phys. **A189**, 417 (1972).

[5] I. G. Aznauryan, V. D. Burkert et al., CLAS Collaboration, Phys. Rev. **C80**, 055203 (2009).